Analytical Methods 2015 vol.7 N19, pages 8344-8351

Simultaneous determination of TBHQ and BHA on a MWNT-Brij® 35 modified electrode in micellar media

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Abstract

© 2015 The Royal Society of Chemistry. A voltammetric method for the simultaneous detection and quantification of tert-butylhydroquinone (TBHQ) and butylated hydroxyanisole (BHA) was developed using a multi-walled carbon nanotube (MWNT)-Brij® 35 modified glassy carbon electrode in Brij® 35 micellar medium. Significant improvements of TBHQ and BHA voltammetric characteristics were observed on the modified electrode. Electrochemical oxidation of TBHQ and BHA is a diffusion-controlled process that is confirmed by the linear dependence of peak currents on $\upsilon^{1/2}$ with R^2 = 0.9983 and 0.9901, respectively, and involves two electrons corresponding to the formation of p-quinones. Under conditions of differential pulse voltammetry, a linear dynamic range of 1.0-1000 μmol L^{-1} for TBHQ and 0.50-7.50 and 10.0-750 μmol L^{-1} for BHA were obtained with the detection limits of 0.26 and 0.15 μmol L^{-1}, respectively. The approach developed was successfully applied for the quantification of TBHQ and BHA in linseed oil samples with recoveries from 99% to 103% after a simple and rapid extraction with Brij® 35 micellar medium.

http://dx.doi.org/10.1039/c5ay01973g